

Feb. 1, 1949.

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2,460,294

TARGET EXCHANGER

Filed June 24, 1944

Fig. 1

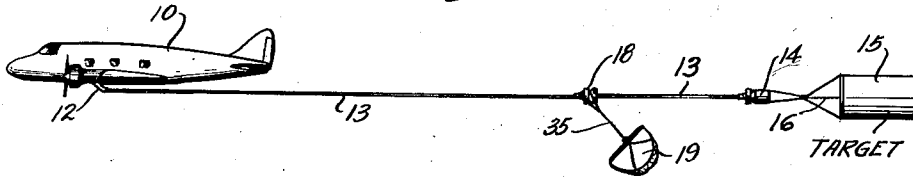


Fig. 2

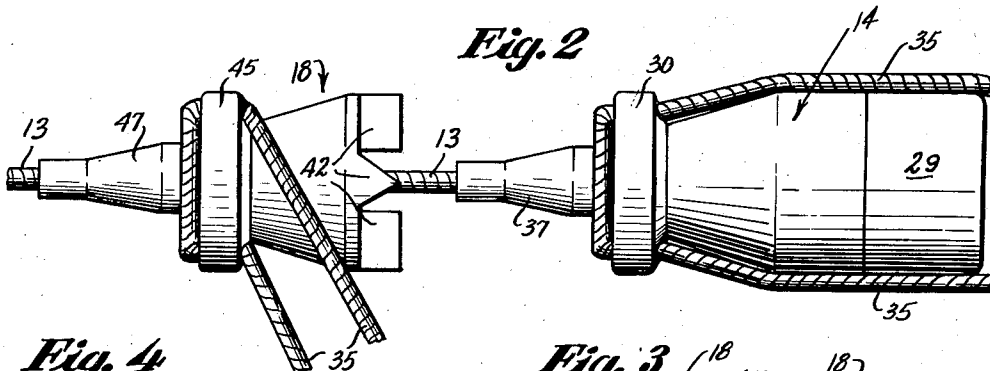


Fig. 4

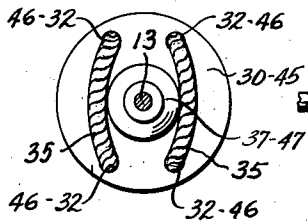


Fig. 3

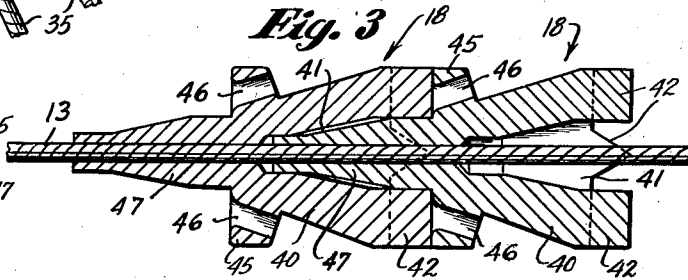


Fig. 5

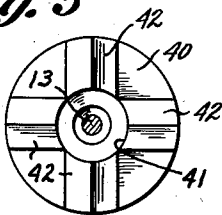


Fig. 6

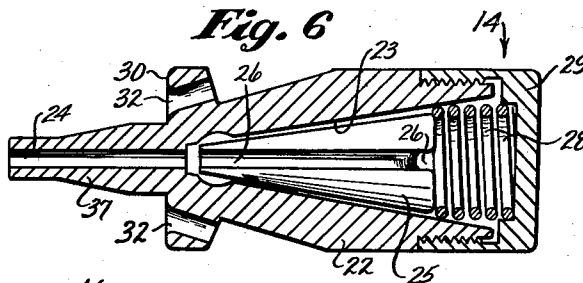


Fig. 7

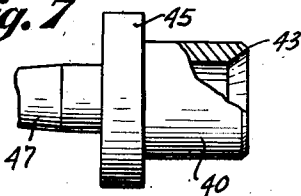
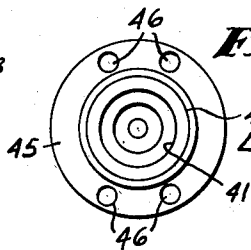


Fig. 8



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2,460,294

TARGET EXCHANGER

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Application June 24, 1944, Serial No. 541,979

5 Claims. (Cl. 273-105.3)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to automatic tow target releasers or exchangers.

One object of the present invention is to provide an automatic tow target release which will sever the target lead cable.

Another object is to provide a target exchange mechanism which will minimize the danger of the tow cable breaking accidentally.

A further object is to simplify the construction of target releasers or exchangers by reducing the number of moving parts therein.

Other objects will become apparent upon considering the following specification which, when taken in connection with the accompanying drawings illustrate preferred types of the invention.

Broadly, the invention comprises a terminal member fixed to a tow cable, said terminal member having an anvil thereon across which is stretched a lead cable to a towed target and an exchanger including an anvil adapted to receive a target lead cable and a cutter on said exchanger adapted to engage the first named anvil and shear the cable thereacross.

In the drawings:

Fig. 1 is an elevational view of a target tow plane with an exchange target on the tow cable, certain parts being shown enlarged for purposes of illustration;

Fig. 2 is a view of the target end of the tow cable showing the terminal member and an exchange target on the tow cable;

Fig. 3 is a longitudinal cross section through two successive exchangers on the tow cable;

Fig. 4 is an end view of the terminal member or the exchanger;

Fig. 5 is an end view of the cutter end of an exchanger;

Fig. 6 is a longitudinal cross sectional view of the terminal member;

Fig. 7 is a longitudinal view, partly in cross section showing a modified form of the invention; and

Fig. 8 is an end view of the cutter end of the modification shown in Fig. 7.

Referring first to Fig. 1, an airplane 10 has a guide tube 12 fixed in the bottom thereof, through which is strung a tow cable 13. The tow cable 13 is provided with a terminal member 14 (to be described more fully below), to which a sleeve target 15 is attached by a target cable 16. An ex-

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changer 18 carrying a replacement target 19 is shown supported on the cable 13. Prior to the release of the target 15, a plurality of exchangers 18 (not shown) are strung on the tow cable 13 and are retained thereon adjacent the guide tube 12 until needed.

As seen in Figs. 2 and 6 the terminal member 14 may comprise a body member 22 having a conical recess 23 therein which communicates with an axial bore 24 adapted to receive the cable 13. A conical plug 25, having the same taper as the recess 23, has a continuous groove 26 formed on two of the sides and across the base. The cable 13 extends through the bore 24, around the periphery of the plug 25 in the groove 26, and is retained in the recess 23 by the wedging action between the plug 25 and the recess 23. A spring 28 is retained in the recess 23 by a cap 29 screw threaded on to the body 22. The spring 28 tends to wedge the plug 25 into the recess and insures retention of the cable 13 in the recess 23.

The exterior of the terminal member 14 is provided with an anvil 30 (Figs. 2, 4, and 6) which is provided with four holes 32 substantially axially therethrough. The holes 32 receive a pair of lead ropes 35 each of which passes through two of the holes 32 as seen in Figs. 2 and 4.

A cutter guide 37 is formed on the forward or leading end of the body 22, and extends from the anvil face forward toward the airplane for a purpose more fully set forth below.

The exchanger 18 is best shown in Figs. 2, 3, 4, and 5, Fig. 4 being a view of either exchanger 18 or the terminal member 14. As best seen in Fig. 3, the exchanger comprises a body portion 40 having an aperture 41 therein which receives the cutter guide 37 of another exchanger 18. The rear end of the body portion 40 is provided with a cutter which may comprise four blades 42 as seen in Figs. 3 and 5 or may comprise a cylindrical blade or chisel 43 as seen in Figs. 7 and 8. By providing four chisel-shaped cutter blades 42 as seen in Fig. 5, then passing the lead ropes or cables 35 over the end of the anvil as seen in Fig. 4, it will be assured that at least two of the cutter blades will strike the two portions of the lead ropes which pass over the face of the anvil. It will be noted in the case of the cylindrical blade 43 that the diameter of the cutting edge is less than the diameter upon which the holes 32 in the anvil on the terminal member 14 are set, but is great enough to insure complete severance of the lead cable 35 by the cutter.

The body portion 40 has an anvil 45 formed thereon, which terminates in a cutter guide 47,

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which are identical to the anvil 30 and cutter guide 37 respectively of the terminal member 14. Each anvil 45 has holes 46 arranged exactly like holes 32 in anvil 30 and adapted to receive lead cables 35.

In practice, the cable 13 is threaded through the guide tube 12 and a number of exchangers 18 are threaded on the cable 13 and secured on or adjacent the guide tube. The tow cable 13 is then threaded through the cutter guide 37 on the terminal member 14 and secured therein by the conical wedge 25.

A target 15 is secured to the terminal member 14 by passing the lead cables 35 through the holes 32 and across the anvil 30 as seen in Fig. 4, and the cable 13 payed out through a winch (not shown) in the plane.

When it is desired to change targets a bundled target 19 is connected to an exchanger 18 by means of cables 35 in a manner similar to the connection between terminal member and the target 15 and the target is launched from the plane. The relative speed of the air and the plane 10 carries the exchanger out along the tow cable 13 until the cutter passing over the cutter guide 37 engages and severs the lead cable 35, releasing the target 15 which floats to the earth and is recovered by a ground crew.

The jar of the exchanger striking the terminal member breaks the ties of the target and permits it to billow out to normal length.

Subsequent targets are supplied on the tow cable 13 by attaching them to exchangers 18 in a similar manner. As each exchanger strikes the previous exchanger it cuts the lead cable carried thereby, releasing the old target and substituting the new target.

Having thus described the invention, it will be realized that the forms thereof shown and described represent preferred embodiments and that various changes in size, shape, and arrangement of parts may be made without departing from the spirit of the invention as defined by the appended claims.

What is claimed and desired to secure by Letters Patent is:

1. In combination, a tow cable having one end adapted to be secured to an airplane, a terminal member secured to the other end of said cable, an anvil on the forward end of said terminal member, a tow target, a target lead cable secured to the tow target and being connected with said terminal member by extending transversely across the forward face of said anvil, and rearwardly directed cutting means mounted on and movable rearwardly along the tow cable and engageable with the forward face of said anvil to sever the lead cable where it extends transversely across said anvil and release said target.

2. In combination, a tow cable having its forward end adapted to be secured to an airplane, a terminal member secured to the other end of said cable, an anvil on the forward end of said terminal member, a target lead cable, a target towed by said lead cable, said lead cable being connected with said terminal member by extending transversely across the forward face of said

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anvil, an exchanger slidable rearwardly on said tow cable, a second target carried by said exchanger, said exchanger including a rearwardly directed knife edge engageable with the forward face of said anvil positioned to engage and sever the lead cable where it extends transversely across the forward face of said anvil and thereby release the first target.

3. In combination, a tow cable having its forward end adapted to be secured to an airplane, a terminal member secured to the other end of said cable, an anvil on the forward end of said terminal member, a target lead cable, a target towed by said lead cable, said lead cable being connected with said terminal member by extending transversely across the forward face of said anvil, an exchanger slidable rearwardly on said tow cable, a second target carried by said exchanger, said exchanger including a plurality of radially extending knives on its rearward face adapted by impact with said anvil to sever said lead cable where it extends transversely across the forward face of said anvil and thereby release said first named target.

4. In combination, a tow cable having its forward end adapted to be secured to an airplane, a terminal member secured to the rearward end of said cable, an anvil on the forward end of said terminal member, a target lead cable, a target towed by said lead cable, said lead cable being secured to said terminal member by extending transversely across the forward face of said anvil, an exchanger slidable on said tow cable, a second target attached to said exchanger, said exchanger including an annular knife on its rearward face adapted by impact to engage said anvil to sever the lead cable where it extends transversely across the forward face of the said anvil to release the towed target from the terminal member.

5. In an airplane tow target arrangement including a tow plane and a tow cable having its forward end attached to said tow plane, a terminal member retained on the rearward end of said cable, an anvil on the forward face of said terminal member, a cutter guide integral with the terminal member and extending forward from said anvil, a target lead cable, a target towed by said lead cable, said lead cable being secured to said terminal member by extending transversely across the forward face of said anvil, and cutting means movable along the tow cable and over the cutter guide and co-operating with said anvil by impact therewith to sever the lead cable and release said target.

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